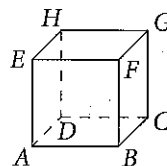


### 3 EXAMPLE Finding the Intersection of Two Planes

What is the intersection of plane  $HGFE$  and plane  $BCGF$ ?

Plane  $HGFE$  and plane  $BCGF$  intersect in  $\overleftrightarrow{GF}$ .



**Quick Check** 3 Name two planes that intersect in  $\overleftrightarrow{BF}$ .

A three-legged stand will always be stable. As long as the feet of the stand don't lie in one line, the feet of the three legs will lie exactly in one plane.

This illustrates Postulate 1-4.

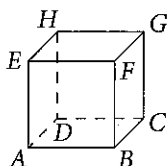
### Key Concepts

#### Postulate 1-4

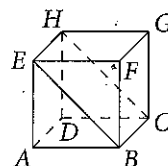
Through any three noncollinear points there is exactly one plane.

### 4 EXAMPLE Using Postulate 1-4

a. Shade the plane that contains  $A$ ,  $B$ , and  $C$ .



b. Shade the plane that contains  $E$ ,  $H$ , and  $C$ .



**Quick Check** 4 a. Name another point that is in the same plane as points  $A$ ,  $B$ , and  $C$ .  
b. Name another point that is coplanar with points  $E$ ,  $H$ , and  $C$ .

## EXERCISES

For more exercises, see *Extra Skill*, *Word Problem*, and *Proof Practice*.

### Practice and Problem Solving

#### A Practice by Example

Example 1  
(page 17)

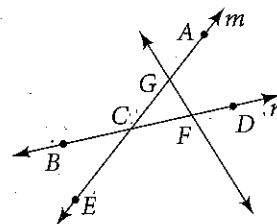


Are the three points collinear? If so, name the line on which they lie.

1.  $A, D, E$
2.  $B, C, D$
3.  $B, C, F$
4.  $A, E, C$
5.  $F, B, D$
6.  $F, A, E$
7.  $G, F, C$
8.  $A, G, C$

9. Name line  $m$  in three other ways.

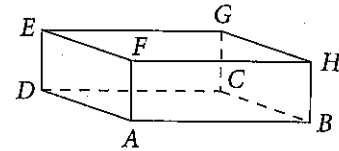
10. Name line  $n$  in three other ways.



**Example 2**  
(page 17)

Name the plane represented by each surface of the box.

- |                   |                    |
|-------------------|--------------------|
| 11. the bottom    | 12. the top        |
| 13. the front     | 14. the back       |
| 15. the left side | 16. the right side |



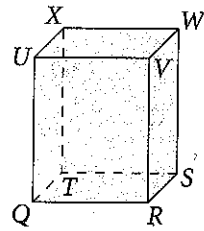
**Example 3**  
(page 19)

Use the figure at the right for Exercises 17–37.  
First, name the intersection of each pair of planes.

- |                            |                            |
|----------------------------|----------------------------|
| 17. planes $QRS$ and $RSW$ | 18. planes $UXV$ and $WVS$ |
| 19. planes $XWV$ and $UVR$ | 20. planes $TXW$ and $TQU$ |

Name two planes that intersect in the given line.

- |                               |                               |                               |                               |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| 21. $\overleftrightarrow{QU}$ | 22. $\overleftrightarrow{TS}$ | 23. $\overleftrightarrow{XT}$ | 24. $\overleftrightarrow{VW}$ |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|



Exercises 17–37

**Example 4**  
(page 19)

Copy the figure. Shade the plane that contains the given points.

- |               |               |               |               |               |
|---------------|---------------|---------------|---------------|---------------|
| 25. $R, V, W$ | 26. $U, V, W$ | 27. $U, X, S$ | 28. $T, U, X$ | 29. $T, V, R$ |
|---------------|---------------|---------------|---------------|---------------|

Name another point in each plane.

- |                 |                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| 30. plane $RVW$ | 31. plane $UVW$ | 32. plane $UXS$ | 33. plane $TUX$ | 34. plane $TVR$ |
|-----------------|-----------------|-----------------|-----------------|-----------------|

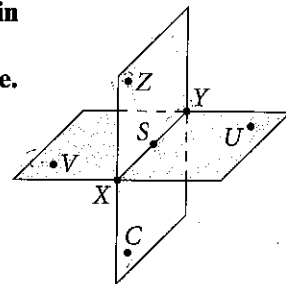
Is the given point coplanar with the other three points?

- |                              |                              |                              |
|------------------------------|------------------------------|------------------------------|
| 35. point $Q$ with $V, W, S$ | 36. point $U$ with $T, V, S$ | 37. point $W$ with $X, V, R$ |
|------------------------------|------------------------------|------------------------------|

**B Apply Your Skills**

Postulate 1-4 states that any three noncollinear points lie in one plane. Find the plane containing the first three points listed, then decide whether the fourth point is in that plane. Write *coplanar* or *noncoplanar* to describe the points.

- |                  |                  |
|------------------|------------------|
| 38. $Z, S, Y, C$ | 39. $S, U, V, Y$ |
| 40. $X, Y, Z, U$ | 41. $X, S, V, U$ |
| 42. $X, Z, S, V$ | 43. $S, V, C, Y$ |

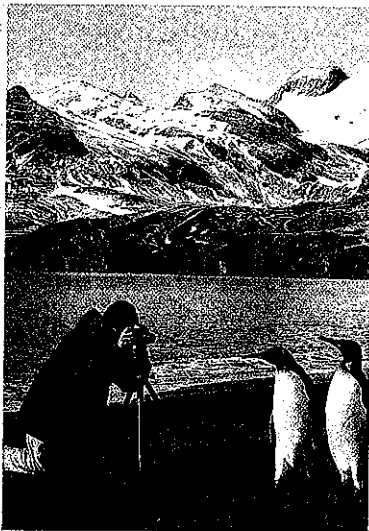


44. **Photography** Photographers and surveyors use a tripod, or three-legged stand, for their instruments. Use one of the postulates to explain why.

45. **Open-Ended** Draw a figure with points  $B, C, D, E, F$ , and  $G$  that shows  $\overleftrightarrow{CD}$ ,  $\overleftrightarrow{BG}$ , and  $\overleftrightarrow{EF}$ , with one of the points on all three lines.

If possible, draw a figure to fit each description. Otherwise write *not possible*.

- |  |                                       |
|--|---------------------------------------|
| 46. four points that are collinear     | 47. two points that are noncollinear  |
| 48. three points that are noncollinear | 49. three points that are noncoplanar |



**Real-World Connection**

**Careers** The photographer uses a tripod to help assure a clear picture.

**Coordinate Geometry** Graph the points and state whether they are collinear.

- |                                  |                                  |
|----------------------------------|----------------------------------|
| 50. $(3, -3), (2, -3), (-3, 1)$  | 51. $(2, 2), (-2, -2), (3, 2)$   |
| 52. $(2, -2), (-2, -2), (3, -2)$ | 53. $(-3, 3), (-3, 2), (-3, -1)$ |

54. **Multiple Choice** Which three points are *not* collinear?

- |  |   |
|--|---|
| <input type="radio"/> A $(0, 0), (0, 2), (0, 4)$ | <input type="radio"/> B $(0, 0), (3, 0), (5, 0)$  |
| <input type="radio"/> C $(0, 0), (0, 2), (3, 0)$ | <input type="radio"/> D $(2, -2), (2, 2), (2, 3)$ |